

# Analyzing the past, understanding the present and building the future.” Gems amid the rocks, and experiences in Mexico

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## ABSTRACT

Product of a long-fought struggle begun by peasants a century ago, the ejido is a communal form of land ownership created as part of the agrarian reform in Mexico. Modifications made to Mexico's Constitution in 1992 led to structural changes within the ejido which allowed its members to sell lands. We share our experience of how different phases of research have shown that peasants of the ejido El Puerto, with 35 members, have learned to recognize the real gems in the ejido's sandy, rocky soils. Through their learning and dedication they have polished these gems until their color, shine and beauty have begun to show through. Valuable natural resources of the ejido are the earth, mangroves, forests, salt ponds, beaches, a coconut plantation, and natural freshwater sinkholes. However, the most valuable of them all are the people who have worked to conserve these resources, using their knowledge, experience and sensitivity.

**Keywords:** ejido, natural resource management, communal landownership.

The search of humans to satisfy their basic needs and improve their quality of life has led them to create complex social structures and interactions which have resulted in the generation of new cultural, spiritual and political necessities (Boyden 1992; Carabias 2006). In order to satisfy such needs, humans use natural resources and environmental services provided by ecosystems.

Ecosystems are defined by their components and the interactions between them. They possess a specific structure and function, and strong disturbances can cause changes in their properties and potentially result in the collapse of the system. Humans are found in most of the planet's ecosystems and represent the species with the greatest capacity to alter ecosystem dynamics through their use of natural resources (Moreno-Casasola et al. 2006).

The history of our planet shows that many areas have been inhabited, modified or manipulated by humans. There are natural areas where indigenous groups live, and this makes them have tacit rights over the territories where they are found. However, regions with high levels of biodiversity also frequently exhibit high human population densities and this situation threatens both the biological and cultural diversity of these areas (Toledo 2000).

Human beings organized in societies have established complex relationships with nature, generating new situations and problems, which call for an analysis of the future of the development of human societies. As part of the human-environment relationship, humans should seek to maintain the integrity of ecosystems by adapting their cultural characteristics with those of the natural systems (Moreno-Casasola et al. 2006; Carabias 2006). For this reason, it is important to analyze the characteristics of natural resource management, particularly that conducted at the community level which represents a predominant focus of the discussion of human use and impacts on ecosystems. In Mexico, the use and management of 80% of the resources of temperate and tropical forests is conducted by rural communities and *ejidos* (Toledo 2000). Ejido is a communal form of land ownership created as part of the agrarian reform in Mexico, product of the revolutionary movement of 1910.

The ejido *El Puerto* is found on the coast of Yucatan, Mexico, and its members have managed the natural resources of the area by implementing conservation projects. We focus on this group given the relevancy of the experiences they have obtained through their conservation practices. In addition, we present a brief historical description of the ejido as a communal form of land ownership and a type of land tenure.

## I. THE EJIDOS IN MEXICO

In Mexico, approximately 52% of the land is under ejido tenure (Barnes 2008), and such condition is one of the consequences of the Mexican Revolution of 1910. The creation of the ejido land ownership system was due to the economic and social contradictions derived from the agricultural, industrial and financial capitalist system, which characterized the dictatorship of Porfirio Díaz. Under colonial terminology, ejidos represented areas of communal use, which belonged to indigenous communities, and the Political Constitution of 1917 recognized them as such, in part because peasants were attached to the symbolic name of the ejido (Gutelman 1974).

By law, ejido lands could not be sold and campesinos had to retain their rights and obligations associated with them. Barnes (2008) mentions that through the ejidos, for the first time since the colonization, land in Mexico was also given a social function and not only an economic function. Nonetheless, in 1992 the Mexican Government made changes to Article 27 of the Political Constitution using as justification a study conducted by the World Bank (2001) that pointed out the lack of commercialization of such lands. In addition, ejidos were typically maintained by old campesinos, which obstructed the access to these lands for new generations. Other reasons were the inability of local governments to acquire ejidos for urban growth, as well as reduced investment in ejidos because resource use in them was considered unsustainable.

The work by García-Frapolli et al. (2007) proposes that legal modifications made to the land tenure in 1992 caused significant changes to the land tenure system of Mexico. Prior to that year, ejidos were collectively maintained by indigenous communities and could not be divided, rented or sold. However, after the agrarian reform, these activities were permitted.

Although the Constitutional Reform of 1992 pretended to stimulate investment in ejidos by means of private associations and in this way create credit opportunities for peasants, critics foresaw that it would result in the massive sale of lands and contribute to greater poverty in rural communities. The subdivision of ejidos would increase the social and ecological pressure on the institutions in charge of managing resources of common use (García-Frapolli et al. 2007; Luers, Naylor & Matson 2006). The 1992 reform resulted in the conversion of ejidos into private lands, and this represented an opportunity for government agencies to acquire vast portions of land in order to maintain or promote their preservation (García-Frapolli et al. 2007).

In 1993, the Mexican Government established the “Programa de Certificación de Derechos Ejidales y Titulación de Solares (PROCEDE)” in order to implement a new agrarian policy aimed at regularizing the ejido land tenure and certifying individual rights. This Program provided a legal framework which

permitted the subdivision of ejidos into smaller portions of land and their redistribution among the ejidatarios, who could then rent or sell them individually (Haenn 2006).

Although the participation of peasants in PROCEDE was voluntary, the certification of the ejidos was a pre-requisite in order to convert the land to private property and it was expected that ejidatarios would follow this tendency (Barnes 2008). Although this program has certified more than 90% of the ejidos in Mexico, in 2005 it was estimated that only 5.3% of these ejidos had acquired complete dominion on the land, and most of these were found in urban areas (Rodríguez 2005).

The massive conversion of ejidos into private lands has not occurred yet, and most ejidos have maintained their fundamental identity. Thus, although most have been certified by PROCEDE, the question remains of whether this new agrarian framework will eventually lead to the privatization of most ejidos in the long run, once enough time has passed since the implementation of this policy (Barnes 2008). Based on this, the ejido has an internal organization, which should be analyzed in order to recognize the possibilities of appropriation and management of natural resources found in them.

## II. THE ORGANIZATION OF THE EJIDO

The holders of rights of the ejido which formally constitute the group are the *ejidatarios*. Within the ejido, in addition to the ejidatarios, an *avecindado* is also recognized and represents a resident in the settlement who does not have the rights of an ejidatario but could obtain the title to such rights. This condition underlines the importance of *avecindados*, which despite not being ejidatarios, contribute to the social and economic life of the ejido (Téllez 1993).

A fundamental characteristic of the ejido is that the level of income of its members and its distribution depend on the capacity of ejidatarios to work collectively and the structure of their organization. The more efficient and organized a given group is, the greater its possibilities of benefiting from its natural resources and the use made of them. Ejidos, which have been subdivided and lack collective practices among ejidatarios are characterized by a concentration of benefits for a minority. On the other hand, it is recognized that the wealth generated by the ejido by creating jobs and sources of income has a positive influence not only on the ejidatarios, but also on people who are not part of the ejido (Rello 1986).

The ejido is immersed in complex relationships with other rural actors, with which it shares the same physical, economic and social space, all of which together constitute what some authors call community. Such a microsociety exceeds the attributes of the ejido, because, in addition to the ejidatarios, it integrates other members of the community. Nonetheless, ejidatarios are the members of the community, which possess the greatest economic power through their control of the land. In this way, some ejidos represent an institution which introduces social and economic dynamism in the community, while other ejidos contribute to social segregation and the concentration of wealth among a few (Rello 1986).

Within the social and economic context of Mexican land, ejidos represent groups of producers, which have control over a portion of the territory, where relationships of cooperation take place and result in a peculiar organization of agricultural practices. The degree of cooperation varies and is one of the distinctive characteristics of an ejido (Rello 1986) which influences the collective practices associated with natural resource management.

## III. THE EJIDO AND ITS NATURAL RESOURCES

In Mexico, the communal management of natural resources by diverse indigenous groups is protected by the Constitution. When the communal type of land ownership was recognized in Mexico by the 1917 Constitution, more than three quarters of the surface covered by tropical and temperate forests were managed by ejidos and local communities (Toledo 2000). Presently, a total of 31,517 agrarian cores exist in Mexico, 92% of which are regularized and have a legal certainty regarding land tenure (SRA 2010).

Ejidos have a social organization, which lends itself to conduct collective activities such as forest exploitation. Its intrinsic organization and structure make the ejido compatible in collaborating with local

Pech-Jiménez, N., Loria-Palma, J. & Castillo-Burguete, M. (2010). *Analyzing the past, understanding the present and building the future. "Gems amid the rocks, and experiences in Mexico*

institutions in order to implement conservation plans and strategies for local and regional development (Sánchez-Azofeifa et al. 2009). In addition, access to and management of natural resources in ejidos is similar to what some authors consider a form of community-based natural resource management (Arce-Ibarra & Charles 2008).

The literature provides examples of natural resource management and conservation in ejidos, some of which represent successful study cases. Factors such as the rights defined regarding the use of land, the degree of organization and cooperation among the members of the ejido, and government funding and collaboration typically determine the characteristics of natural resource management in a given ejido (Arce-Ibarra & Charles 2008; Perez-Verdin et al. 2009; Bello-Baltazar 2001).

For example, the work by Arce-Ibarra and Charles (2008) on traditional fisheries in ejidos of the state of Quintana Roo, Mexico reported a lack of organized use of natural resources and an imprecise definition of rights of use of such resources. Ejidatarios had received almost no support from the government, the ejido's organization was weak, and local conflicts and corruption of the authorities were common.

Usually local people ignore the fact that their ejido is part of a natural preserve, and the conservation implications this has (Porter-Bolland, Drew & Vergara 2006). For instance, in the Biosphere Reserve of Chamela-Cuixmala, in the state of Jalisco (Mexico), adjacent ejidos are not aware of their conservation role in the area, and have not received the appropriate training to achieve a sustainable management of their resources, which is compatible with the Reserve's objectives. This is despite the fact that the Reserve's management plan recognizes the need to provide technical support to local people and establish strategies of collaboration with them (Pujadas & Castillo 2007).

With respect to ejidos located on the coast of the state of Sonora, Mexico, Luers, Naylor and Matson (2006) suggest that the agrarian reform of 1992 has not had a relevant contribution in increasing the participation of ejidatarios in shrimp cultivation. The involvement of ejidos in shrimp cultivation has been limited, as less than 10% of them have participated in the development of this industry. Such condition derives, in part, from the skepticism of local people regarding the validity of the property titles provided by PROCEDE.

Based on these factors, Barnes (2008) considers that land tenure in Mexico represents an institution, which mediates the relationship between social and ecological components of a socio-ecological system. As such, land tenure has shown a high level of resilience, represented by the ability of this institution to maintain its fundamental identity despite disturbances such as changes in land tenure policies or macroeconomic initiatives like the North America Free Trade Agreement (NAFTA).

The Mexican Government created PROCAMPO as a response to the negative impact of NAFTA on the rural sectors of Mexico given that Mexican companies were forced to compete with importations from the United States. This program was designed to ameliorate the loss of income due to low market prices. In this sense, Barnes (2008) considers that PROCAMPO and other similar programs have buffered ejidos against economic forces, which could have changed the ejido as a type of tenure.

Rello (1986) indicated that although peasants aspired to have ejidos that were less subject to state intervention as well as enjoy more efficient support from the government, they had not fought to substitute this organization and neither did post-revolutionary governments in the past. Quite the contrary, due to insufficient agricultural production and protests by peasants, during recent decades the Mexican Government has allocated more resources to agricultural activities and distributed more land among ejidatarios than among private owners.

#### IV. NATURAL RESOURCE MANAGEMENT AND CONSERVATION

An accelerated loss of biodiversity is taking place worldwide, resulting in a decrease in the capacity of ecosystems to provide benefits and services to human societies, despite the fact that human activities which negatively impact ecosystems provide social benefits (Tilman 2000). In particular, habitat destruction due

to human activities has resulted in a reduction of the number of species, as well as genetic diversity within populations (Dirzo 2006). In this way, the need to conserve biodiversity necessarily points at natural resource management, particularly at the local level, and the development of sustainable strategies to face this emerging problem and reverts its consequences.

Only some components of ecosystems are considered natural resources, and as such are used to satisfy human needs. These resources are used in different ways, either in their natural state or transforming them into new sources of energy or merchandise. Thus, the concept of natural resource is characterized by the social use that is given to a particular resource (Bassols 1986). Leff (1993), for example, considers that any system of natural resources is defined by the cultural influences of a group, and that any production unit depends on the rationality of its productive agents which in turn will vary depending on the history of cultural and productive practices which have defined which components of an ecosystem are viewed as natural resources and the socio-cultural ways of using them.

The appropriation of nature by humans, through rural production processes, is the base in order for societies to grow (Toledo 1994). Toledo (2006) points out that the appropriation of nature by human societies takes place in two ways: 1) by extracting components of nature and modifying an ecosystem by means of productive activities (e.g., fishing and hunting) but without modifying the system's structure, and 2) by removing the original ecosystem and substituting it by novel components such as agriculture and cattle raising, characterized by the presence of domesticated or exotic species.

Overexploitation of natural resources is jeopardizing human survival, and this situation calls for strategies aimed at offsetting the adverse effects of human activities on ecosystems. One alternative is to develop an ecologically rational use and management of natural resources; to achieve this, social participation is necessary in order to actively involve members of local groups, which make use of such resources.

Natural resource management refers to the type of social appropriation and exploitation of biotic and/or abiotic components of ecosystems by a society or human group. This concept encompasses knowledge and technical abilities related to biophysical processes, a social component related to negotiation for rules, the formulation of policies, organization development, land use planning and management of conflicts and information (Probst & Hagmann 2005). Natural resource management also refers to the right to regulate the patterns of internal use and transformation of resources in order to improve them (Ostrom & Schlager 1996, cited in Carlsson & Berkes 2005); it includes land use planning, resource use, and conservation and restoration of goods and services provided by ecosystems (Oyama & Castillo 2006).

This perspective of natural resources management has a tendency towards the conservation of biodiversity and entails the protection of natural spaces and species, focusing on the maintenance of functions, processes and dynamics of ecosystems (Durand 2006). Thus, biological conservation is essential to maintain the sources of natural resources necessary to generate ecosystem services, favor their resilience and provide future opportunities (Millennium Ecosystem Assessment 2005).

Management strategies should consider the characteristics of each ecosystem and for this reason are expected to vary between terrestrial or coastal ecosystems, for example. In addition, a fundamental aspect of designing these strategies is analyzing management patterns at the community level by means of management and conservation models, which incorporate social participation.

## V. COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT

Agrawal and Gibson (2001) point out that development and conservation practices implemented during the past decades have revealed the limited capacity of governments to promote citizen participation. As a result, contemporary methods have focused on natural resource management based on a community-level

approach. The underlying assumption is that due to the benefits it receives, the community has incentives to use natural resources in a sustainable manner.

For Slocum and Thomas-Slayer (1995), natural resource management should recognize the values, interests, objectives and perceptions of communities when designing, executing and evaluating development policies and research. It is important to respect traditional practices which characterize the cultural identity of human societies, when don't threaten the use of a given resource.

One alternative for natural resource conservation is ecotourism, defined as the enjoyment of nature through tourist activities, which have low levels of impact on ecosystems. Ecotourism sustains that economic demand should not cause a radical change in labor and traditional activities at the local level, respecting the populations cultural practices (Jayawardena 2002). Ecotourism also proposes a respectful relationship between the community and its natural surroundings by promoting a minimum level of education, medical assistance, justice, dignified jobs, access to land as a source of labor, and the conservation of natural resources (Barkin 2006).

Some studies indicate that a frequent effect of ecotourism is to change traditional community activities (García Frapolli et al. 2007; Nigh 2001). Given its current popularity, Kiss (2004) proposes a rigorous evaluation of projects based on ecotourism activities, and demands that such projects should be based on reliable information when deciding when and how they should be implemented for a particular situation and place. This entails the identification of clear conservation and socioeconomical objectives, which should be linked to incentives and activities conducted by the community.

The participation of communities in natural resource management takes place in a social, political and economic context. Feldman (1994) points out that although countries can adopt tendencies towards sustainable development, they are frequently incapable of constructing and reinforcing coherent public policies. This condition warrants the establishment of mechanisms to increase social participation in national politics and guarantee the transparency of the decision-making process. The experiences of some communities in this sense can contribute to the understanding of present conditions and the identification of future possibilities. For this, we use as case study the ejido El Puerto, where people have applied their traditional and scientific knowledge to the management of their natural resources.

## VI. THE GEMS OF EL PUERTO

El Puerto is the name shared by a community and an ejido located on the northern portion of the state of Yucatan, Mexico. As examples of the natural resources present in this ejido, some of the most abundant tree species are the red mangrove (*Rhizophora mangle*), white mangrove (*Laguncularia racemosa*), and, to a lesser extent, zapote (*Achras zapota*), *Ficus conitifolia* and huano (*Sabal sp.*). The coastal dune vegetation is also very important due to the presence of nitrogen-fixing plant species, as well as others, which are edible or used in traditional medicine (Batllori 2002).

El Puerto has a total area of 1,472 ha, of which 61% are wetlands that have suffered a process of deterioration during the last 35 years resulting in a reduction of the surface covered by mangroves and changes in water currents originating from sinkholes. Such conditions have also resulted in the disappearance of several species of birds and fish (Batllori 2002).

The flora and fauna present in this coastal site are of great economic importance and have been used by the members of the ejido and the community through productive activities. The ejido has also undertaken efforts to conserve the wetlands and species present in the area (Castillo 2001; Dickinson et al. 1996). For example, in 1999 a wildlife management and conservation unit called "Unidad de Manejo para la Conservación de la Vida Silvestre (UMA)" of 1,020 ha was established, which has 69% of its surface covered by wetlands and mangrove vegetation.

There is no precise data available on when El Puerto was first populated. Castillo (2001) cites evidence, which describes the arrival of the first colonizers and their management and use of natural resources.

Presently, the most important productive activities in the area are the cultivation of coconut palm (*Cocos nucifera*), salt extraction and fishing.

Until 2007, the community of El Puerto had 527 inhabitants, of which 53% were men and 47% were women, arranged in a total of 136 families. Of the total population, 35 are ejidatarios, and of this group three are women (Centro de Salud de Yucatán 2007). Most ejidatarios (65%) were born in El Puerto, while the rest were born in adjacent communities and villages, although they have lived in El Puerto since their youth. More than half of the ejidatarios (69%) live in El Puerto, while the rest live in neighboring communities. The ejidatarios form a heterogeneous group in terms of their age, education level and occupation.

Ejidatarios range from 38 to 89 years of age, and their level of education is generally low. Close to half of the members (46%) did not finish elementary education, and only 6% finished their high school studies. Both men and women of the ejido work in diverse activities, which in addition to work associated with the ejido, also include complementary activities such as fishing, commerce and jobs in public or private organizations. Women who belong to the ejido are dedicated mostly to housework.

The ejidatarios typically share their experiences with other members of the ejido and such process of group participation has enriched their learning process. In particular, the development of a self-managed capacity has been fundamental in order to implement natural resource management projects, which have resulted in economic benefits to the ejido and the community. Such capacity has resulted after more than 35 years of efforts to obtain a patrimony which generates a reliable source of income, given that other activities such as fishing do not always provide a reliable income.

The history of the ejido El Puerto starts on November 19 of 1956 when a group of people of the community presented a petition for lands (Castillo 2001). Such petition came from the need to obtain lands to work which in turn provided economic security.

The founding ejidatarios relate that the establishment of the ejido took place in two phases. The first took place during the mid 1950s and failed due to conflicts with the previous landowners, which did not agree to concede the lands. Other conflicts also occurred between petitioners because some of them obtained economic benefits from the landowners by obstructing the acquisition of land by the ejido. During this initial stage, El Puerto lacked schools, and such condition represented a disadvantage for the founders because they did not know how to read or write.

It was not until the second half of the 1960s when some of the first land petitioners, their descendants and acquaintances initiated negotiations for the acquisition of lands, influenced by the establishment of neighboring ejidos. When this second phase of negotiations started, a school was already present in the community and several of the youngest petitioners had received their education there. The presence of these educated members provided knowledge which facilitated negotiations.

Since the first round of negotiations, the ejido has propitiated learning processes among its members. During the second phase of negotiations, educational, laboral and personal experiences were shared between old and new members of the ejido, and this situation provided the necessary knowledge, which facilitated obtaining the land. In addition, the ejidatarios established contact with state politicians in order to obtain the land; previous landholders had also used their relationship with politicians to obstruct the negotiations.

After several years of negotiations, on May 25 of 1973 the Governor of Yucatan made the official announcement of the donation of 1,490 ha to 30 recipients, a portion of land with the school, and an Industrial Agricultural Unit for Women (UAIM), all of which were given under provisional possession to the ejidatarios on June 14 of the same year. The President of Mexico modified this resolution and on April 25 of 1980 granted the ejidatarios with 1,472 ha. The resolution was completed on October 31 of 1986 and included 29 recipients, the land for the school and the Agricultural Unit (Castillo 2001). However, it was not until October 22 of 1992 that the ejido was granted the legal possession of the land.

After the incorporation of the ejido to PROCEDE in 1994, few years later several internal conflicts arised such as disagreements regarding the unequal distribution of economic benefits among the members of the ejido. Since then, the ejido has tried to solve these problems and achieve a greater sense of unity. In order to accomplish this, they have made changes to their procedures such as the election of a board of directors, the creation of “fajinas”<sup>1</sup>, and the regulation of rights and obligations of the members.

The current land tenure in hands of the ejido has generated conflicts over the access to natural resources present in the area. Such conflicts have worsened after the regularization and entitlement of the lands by PROCEDE. Conflicts took place both between community members as well as between the ejido and the municipal authorities. The ejidatarios resorted to legal measures and were in charge of regularizing the land to obtain the entitlement, rejecting the proposals by the CORETT<sup>2</sup> due to the disadvantages they presented, principally due to high costs. This decision was motivated in part by the members of the ejido with the highest level of education, who had knowledge regarding the negotiation process. These members had an important contribution, which helped to overcome the legal difficulties.

The ejido has gone through frequent economic problems, and this has motivated the members to establish and mantain policies which facilitate the access to sources of financial support. One important strategy has been the commercialization of products and services derived from natural resources. In addition, to facilitate the implementation of projects, members of the ejido have obtained financial support from the government as well as national and international non-governmental agencies.

During both of the previously described negotiation stages, as well as after its establishment, the ejido has undergone structural changes in order to adapt to the needs, which have arisen with time. Economic and/or political events, as well as modifications to the Agrarian Law, the incorporation of new members, and the participation of women during the most recent years have all represented relevant challenges to this group.

The ejido El Puerto has been characterized by having a well-defined organization, which regulates the actions of its members. Proof of this are its representation body and an internal regulation developed by the ejidatarios based on the Agrarian Law. This regulation establishes the rights and obligations of the ejidatarios, as well as sanctions resulting from a failure to fulfill responsibilities. Its most recent revision was two years ago.

The incorporation of new members has taken place in two ways: the inclusion of new ejidatarios by means of an assembly agreement and by rights of succession of the founder. Although 30 petitioners had originally been benefited by the donation of the lands, some left the group due to death, others due to retirement, and finally some were terminated due to their lack of interest in the ejido and the use of its resources. Such events represent experiences, which have been incorporated by the organization to improve their current processes.

Decision-making is a particularly crucial process, which dictates the dynamics of the group. During the monthly assemblies, several aspects are discussed such as the functioning of the group, analysis of projects, which are underway, and ejidatarios also take advantage and use these gatherings to socialize. The ejidatarios describe these reunions as gratifying. Importantly, assemblies are the main mechanism by which members take decisions, and the percent of members which assist to these reunions is of 85% on average. In general, assemblies serve to descentralize the power because members question the decisions made by the board of directors, and approve or reject them.

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<sup>1</sup> Fajinas refer to the work each member contributes periodically for the benefit of the community, without obtaining economic remuneration.

<sup>2</sup> CORETT is the Commission for the Regularization of Land Tenure, and is a decentralized public institution which is part of the Executive Federal Power. It has both a technical and social nature, legal attributes and patrimony, and has as main objectives “to regularize the land tenure when irregular human settlements are located at sites of social origin (ejidal or communal) and of federal property, as well as promote the acquisition of lands and reserves for urban development (CORETT 2010).

To analyze proposals and make decisions, in addition to assemblies, more than 10 years ago the ejido formed a consulting committee integrated by 12 to 15 members. This committee has as main goal to have an influence on the discussion and dynamics held during the assemblies, which are typically lengthy due to the large number of aspects discussed and the slowness to reach agreements. The committee discusses the main points to be dealt with during the assembly, and seeks for consensus between different points of view on a given topic in order to submit them to evaluation. Family and friendship alliances are important for the approval of proposals put forward by the consulting committee, and this aspect is emphasized by Castillo (2001) and Martínez-Mateos (2005) who underline the relevancy of lineages and kinship between the members.

The board of directors of the ejido has acquired a greater level of independence in making decisions during the most recent years. It has been empowered by the assembly to make decisions regarding the assignment of jobs in the ejido and now enjoys a greater influence on commercial activities. Nonetheless, it must inform the assembly of the decisions it makes. Most of the members (74%) have been a part of the board of directors at least one time.

The process of decision-making in the ejido El Puerto has gone through different phases which have been characterized by varying degrees of verticality and horizontality. Overall, kinship and friendship bonds predominate, and opinions can be in favor or against the point of view of the majority.

The ejido's natural resource management has been diversified and is centered on the following resources: mangrove (850 ha), coconut plantations (120 ha) and salt ponds (15 ha). Since the beginning of this decade, ecotourism has become a relevant alternative and incorporates the use of mangroves and coconut plantations. Specifically, ecotourism activities include tours with boats throughout an 11-km long network of channels found in mangrove forests, as well as the sale of coconut palms and rent of ecological huts. The salt ponds are currently inactive, although the salt industry was a common activity more than two decades ago, before the hurricanes Gilbert in 1988 and Isidore in 2002, which had strong impacts on the coast of Yucatan.

Members of the ejido manage their natural resources using knowledge acquired during their youth, when undertaking jobs associated with the use of natural resources of the ejido, through massive means of communication, as well as via workshops given by institutions which have collaborated with them. They have a vast knowledge, in most cases acquired by both formal and informal education.

The knowledge ejidatarios have regarding their natural resources is made evident by their concern about the negative effects of hurricanes on mangroves, coconut plantations and salt ponds, as well as the consequences of overexploitation of these natural resources.

A previous study found that socialization influences the acquisition of knowledge on natural resources by families of the ejido El Puerto (Martínez-Mateos 2005). Parents instruct their children how to use the necessary tools and the way in which they should conduct a given activity; as children start learning about natural resources, parents gradually grant them independence to conduct activities.

Members also share traditional beliefs, which are transmitted from one generation to another, and these have to do with the way they relate to natural resources. This type of knowledge is related mainly with the use of mangrove species, and several members of the ejido refer to the presence of the *dueño del monte* or owner of the forest, who they should respect in order to gain his protection.

The ejido has interacted with politicians as well as scientists to manage their natural resources and make a use of them without causing their deterioration. Their relationship with other institutions has had an influence on the way in which they manage their goods, and this can be observed in the characteristics of their resource management and the current spatial distribution of such resources.

Each development stage of the ejido has represented a learning process, during which the members have gained experience regarding the natural resource management. Ejidatarios recognize positive and

negative impacts of their activities on some of these resources. For instance, ejidatarios explain that during the early years when the ejido had recently been established, they ignored the negative impacts of removing a portion of the coastal dune vegetation to plant coconut trees.

The members of the ejido now acknowledge the importance of the coastal dune vegetation, and this is largely due to workshops and talks on conserving natural resources, which have taken place through ecotourism projects. Scientific institutions as well as non-governmental organizations that have collaborated with the ejido El Puerto have had an influence on resource management practices conducted by the members, and in a way, these interactions have made up for their lack of a formal education.

The transference of knowledge in the ejido has taken place in a bidirectional manner and it is common for members to share their experiences. The youngest contribute with what they have learned in school and through special courses, while the older members contribute with the knowledge they have gained through their experiences in life. The combination of knowledge and experiences coming from different sources has allowed them to compensate for the lack of skills in certain areas and has influenced the implementation of conservation projects, which have won national and international awards.

One important source of learning has been the negative experiences of adjacent ejidos, which members of El Puerto have taken into consideration. An example of this is the sale of massive extensions of land in such ejidos, a situation which as been controlled in the ejido El Puerto as members have foreseen the negative consequences this would have, due mainly to the impossibility of being able to use their natural resources.

The tendency towards the commercialization of land belonging to ejidos is a matter of concern because it represents the loss of a patrimony and the transformation of the meaning of the land and the identity of the peasant (Appendini 2008; Torres-Mazuera 2008). The members of the ejido El Puerto have learned from experiences of neighboring ejidos regarding the importance of conserving natural resources and being well organized in order to make the group more efficient. In this sense, the influence of cultural values through the knowledge of older people has been an important factor.

As a product of these teachings and their interest in using their resources, the ejido El Puerto includes all its projects and activities under the name *El Puerto, a sustainable development project*. The concept of sustainable development is familiar to two thirds of the ejidatarios (66%), who define it as the use and conservation of natural resources, in terms of the economic benefits for the ejido and the community. The remaining members (34%) ignore the meaning of this type of development, although they have heard of it. The youngest members of the ejido are the ones who best understand this concept, have the highest level of education and have occupied the highest positions in the organization.

The interest of the ejido in the conservation of natural resources is the result of their learning processes, and has resulted in the development of profitable projects for the group. The combination of cultural aspects, sharing of individual experiences and those from other ejidos, as well as the interaction with governmental and non-governmental institutions have shaped the way in which the members of the ejido manage their natural resources.

The members perceive a positive future for the ejido due to the projects that are currently taking place as well as those, which they plan to implement in the future. Nonetheless, a fifth of the members believe that the future will be positive in the short-term due to the current projects, but uncertain in the long run as this depends on the decisions made by the successors. They are concerned about the mentality of future generations, their interest in conserving natural resources and avoiding overexploitation, as well as their motivation to maintain the current status of land tenure and the identity of the place they were born in and where they have had significant family and community experiences.

An increase in the number of female members of the ejido is expected for the following years, and for many this was unimaginable at the moment the ejido was established. Moreover, a little over half of the members (55%) consider the possibility that the ejido will be constituted mostly by women if the current

members inherit their right to female relatives. For some of the members, this situation depends on female beneficiaries accepting their right and not giving it up to male relatives, which is something that has occurred in the past.

The members of the ejido have shown a tendency to name their wife or daughter as beneficiaries, and this will modify the structure of the ejido as the succession process takes place. Given this situation, some of the current members are concerned with the lack of participation of current female members and this is due to several reasons such as their lack of knowledge regarding the ejido's processes, their recent incorporation, and because they represent a minority in a group dominated by males. Males consider it a priority that their beneficiaries receive the proper training, and that they participate in activities related to the ejido. This measure is necessary in order to guarantee the permanence of the ejido and its management project.

Finally, concerns regarding administrative aspects of the ejido remain an important aspect which should be addressed in order to improve its organization. Nonetheless, current members consider that the only way to guarantee the permanence of the ejido and assure its growth is that both they and their successors maintain their commitment with the group, continue with the projects and conduct an adequate use of the natural resources.

## VII. CONCLUSIONS

The previously mentioned studies highlight the success of the ejido El Puerto in managing its natural resources. One of the main achievements of its members is to have established and maintained the group, converting it into a patrimony and source of economic support through the use of non-marine natural resources. The ejido has also represented a source of jobs for the community, as well as an adequate setting for the development of projects, which have won both national and international awards. The ejido has also enjoyed a certain degree of independence from the authorities in terms of their capacity for organization and implementation of mechanisms to promote commitment, cooperation and participation all of which are necessary for decision-making.

The members of the ejido El Puerto have shown a capacity to find alternatives for the use of natural resources, which are considered gems due to the variety of management possibilities they offer. These gems of nature represent a patrimony, which has improved the quality of life of the ejidatarios and their families. Natural resources are of such high value that the ejidatarios and members of the community do not allow their reduction or deterioration.

The group vision of the ejido El Puerto is constructed from the knowledge its members have acquired through time, most of which has originated from informal education, thus emphasizing the value of cultural aspects such as traditions, customs and the openness to learn from others. Its members manifest a strong desire to better themselves and a tendency to prefer collectivism rather than individualism because they acknowledge that the possibilities they have to achieve their objectives increase through group effort. In this way, the most valuable gem of this ejido are the people themselves, their experience, discrepancies and agreements because the search for a common good through organized work and a group effort is what matters most to them.

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